

Fiber-Coupled Spectrometer for TPS Materials, Phase I

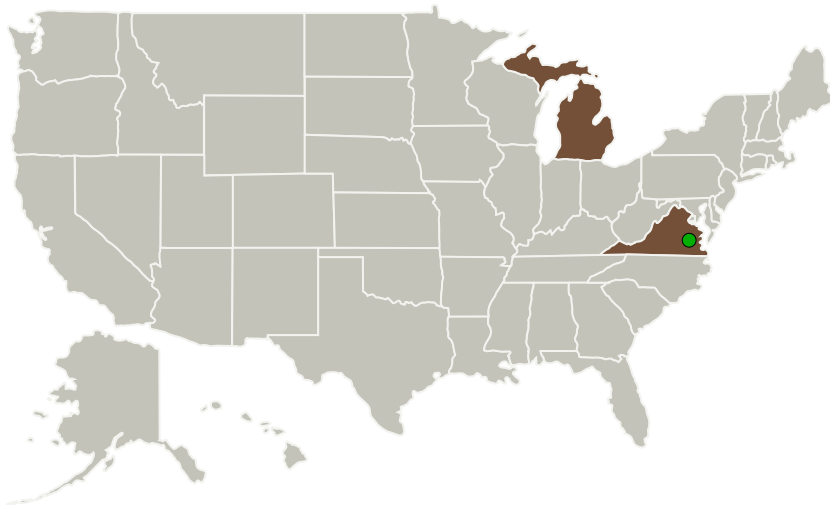
Completed Technology Project (2010 - 2010)



Project Introduction

Heat shield technology is a critical component of manned spaceflight. In particular, the new Crew Exploration Vehicle (CEV) requires thermal protection systems (TPS) beyond the current state of the art. While new TPS shields are under development, a key difficulty is the ability to diagnose TPS performance. In Phase-I SBIR research carried out by EDA and Penn State, we developed a low intrusive fiber optic plug insert for TPS materials that will enable spectrographic measurements of the reentry environment surrounding an ablating TPS. We propose to develop a ruggedized compact spectrometer suitable for coupling with this low-intrusive fiber optic insert. This resulting fiber-coupled spectrometer system plug enables the collection of benchmark data for fundamental flow, radiation, and materials modeling as well as operational correlations between vehicle reentry drag and radiation if implemented in a TPS flight test. The program proposed here will take the concept, originally encouraged at the request of researchers at NASA Ames, from concept to demonstration, through prototype, to a technology readiness level suitable for inclusion in the design of an ablation shield flight demonstrator mission.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ElectroDynamic Applications, Inc.	Lead Organization	Industry Minority-Owned Business	Ann Arbor, Michigan
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Michigan	Virginia
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Project Transitions

▶ **January 2010:** Project Start

✓ **July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139941>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ElectroDynamic Applications, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

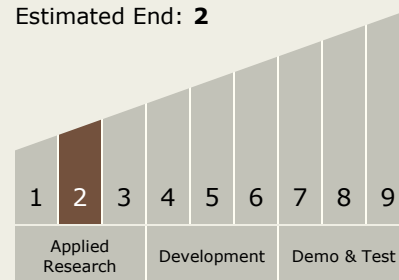
Carlos Torrez

Principal Investigator:

Dean R Massey

Technology Maturity (TRL)

Current: **2**
Estimated End: **2**



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.4 Vehicle Systems
 - └ TX09.4.5 Modeling and Simulation for EDL

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System